Emotion and Memory in Technology Adoption and Diffusion

Completed Research Paper

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ABSTRACT

Data collected from 338 health care workers were used to test a proposed model that inspiration, memory, and inspirational memory affect end user intention to adopt a digitized patient record software application. Structural equation modeling showed that, as expected, inspiration from managers and trainers affected the individual behavior of the end users. Inspiration had an interactive impact through memory on collective acceptance of the technology, thereby affecting subsequent evaluations and behavior. The proposed model was nomologically validated through the use of a portable platform loaded with software for the electronic collection of operational-level health care data. Embedded metrics measured participants' memory as operationalized by task completion time, number of errors, and completeness of the data. This paper contributes to the literature by introducing inspiration as a key driver that improves memory to affect end user intention to use digitized patient record technology.

Keywords

Inspiration, adoption, technology acceptance model, training, user acceptance, emotion, cortisol.

INTRODUCTION

The integrative framework of technology use (IFTU) posits that to fully explain post-technology adoption phenomena, one must consider reason-oriented action, sequential updating, feedback, and habit in a unified model (Kim and Malhotra 2005). Although the IFTU sheds light on the four mechanisms underlying technology use, it lacks a coherent theoretical explanation for the underlying force that leads to these mechanisms. Kim (2009) recently extended the IFTU by applying the process model of memory in cognitive psychology to the technology acceptance model (TAM). Yet even this extended IFTU fails to consider the role of memory and inspiration in technology use. The present paper contributes to the literature by proposing a model that takes into account the roles of inspiration, physical measures of memory (i.e., time to complete a script and number of errors), and the measurement of salivary levels of Cortisol.

Empirical results from research on information technology acceptance suggest that attitude and subjective norms may have a nonlinear relationship with technology acceptance (Titah and Barki, 2009). According to the TAM, ease of use and usefulness are two primary determinants of behavioral intention and usage (Davis, 1989; Subramanian, 1994; Doll et al., 1998; Agarwal and Prasad, 1999; Venkatesh, 2000; Venkatesh et al. 2003; Venkatesh and Bala, 2008). A parallel research stream emphasizes voluntariness, a key social influence and contextual variable, as a critical factor in information technology adoption, but pays little attention to its role in TAM (Wu and Lederer, 2009). However, no attention has been paid in these models to inspiration. In fact, emotion is often viewed as having a negative impact on technology acceptance through fear of the software application and anxiety surrounding its use. We argue that not only do attitude, perceived behavior controls, and social norms influence intention to adopt technology, but inspiration and memory effects can be measured by salivary Cortisol levels. The current study aimed to determine whether inspiration can be manipulated and, if so, how increased inspiration affects both memory and the situational motivation of end users to accept new technology. The present paper hypothesizes that inspiration positively influences intention to use technology, that memory, as measured by decreased time to complete a test script after being exposed to an inspirational stimulus, positively influences intention to use technology, that memory, as measured by decreased number of errors in the completed script after being exposed to an inspirational stimulus, positively influences intention to use technology and that these phenomenon are directly related to salivary Cortisol levels of the end user trainees. The proposed study hypotheses were examined via parametric statistical analysis including descriptive statistics, pair-wise comparison of means, correlation and linear regression. Of data collected from 74 end users who were divided into a control group and an "inspired" group who received a pep talk and video "I'm an IBMer". The rest of the paper will present a comprehensive literature review and analysis of these hypotheses.

The present paper also hypothesizes that inspiration positively influences intention to use technology, that memory, as measured by decreased time to complete a test script after being exposed to an inspirational stimulus, positively influences intention to use technology, that memory, as measured by decreased number of errors in the completed script after being exposed to an inspirational stimulus, positively influences intention to use technology and that the interaction of memory and inspiration positively influences intention to use technology. The proposed study hypotheses were examined via structural equation modeling (SEM) analyses of data collected from 338 users. The rest of the paper will present a comprehensive conceptual model and then build it piece by piece, presenting hypotheses along the way.

Inspiration and Cortisol

Recent scholarship in mainstream psychology has advanced the study of inspiration (Hart, 1998; Thrash and Elliot, 2003, 2004); however, this psychological construct has yet to be explored in terms of technology acceptance. Inspiration has been conceptualized as an experience that 1) implies motivation, 2) is evoked and not initiated directly, and 3) involves transcendence of one's usual abilities (Thrash and Elliot, 2003). Trait inspiration involves individual differences in the ability to experience inspiration and relates to several personality traits, including openness, absorption, positive effect, work mastery, creativity, and optimism (Thrash and Elliot, 2003). State inspiration involves two component processes: being "inspired by" and being "inspired to." "Inspired to" embodies the notion that one is moved to act on a feeling of motivation, whereas "inspired by" measures whether one is inspired by a stimulus (Thrash and Elliot, 2004). In other words, the "inspired by" component recognizes the presence of inspiration but not necessarily the tendency to act on that inspiration. Compared to "inspired by," "inspired to" is positively related to responsibility and approach motivation (Thrash and Elliot, 2004). Furthermore, the two processes have different antecedents: "inspired by" implies transcendence and denial of responsibility (e.g., inspiration from a beautiful image), whereas "inspired to" implies motivation evoked from an external source that spurs one to act toward a certain goal (Thrash and Elliot, 2004). In terms of technology acceptance, researchers assume that managers or leaders can inspire end users to perform a certain action (i.e., "inspired by").

The terms motivation and inspiration are often used interchangeably. However, motivation is the regulation, direction, and energy behind one's behavior (Roberts, 2001), whereas inspiration is an evoked sense of energy from a source that implies motivation. In other words, inspiration is an external stimulus that may influence motivation or facilitate self-determined motivation and autonomy (Thrash and Elliot, 2004). For example, software developers sometimes point to inspiration as a source of end user motivation (e.g., when describing trainers who deliver inspirational speeches to motivate end users). Moreover, in qualitative research on the experience of and meaning ascribed to inspiration, participants differentiated inspiration from motivation, stating that they were not the same experience (Hart, 1998). These findings provide initial support for differentiating inspiration from motivation and clarifying it as a unique construct in the literature. Of particular interest is whether inspiration can increase situational motivation. To date, no one has studied whether inspiration actually increases autonomous motivation. Correlations have been made (Thrash and Elliot, 2003, 2004), and implications for motivation changes have been offered (Burleson, Leach, and Harrington 2005; Lockwood and Kunda, 1999), but the true test of a variable is its manipulation. According to Thrash and Elliot's conceptualization, inspiration is evoked and implies motivation. An inspirational stimulus evokes a response and provides energy toward a goal. Being "inspired to" do something empowers individuals, giving them a feeling of control over their actions, which is the essence of autonomy. Individuals who are "inspired to" may thus experience satisfaction of the need for autonomy (Deci and Ryan, 1985). Therefore, it is possible that increases in perceived inspiration could be associated with increases in situational autonomous motivation.

Wichmann et al. (2012) point out that emotional memory enhancement is a well-recognized phenomenon that helps us to remember important life events. Both positive and negative emotionally arousing experiences are more likely to be recalled with greater detail and vividness than events that lack emotional significance (Bradley, Greenwald, Petry, and Lang, 1992; McGaugh, 2006). However, studies investigating the neural mechanisms underlying arousal-induced memory enhancement have focused almost exclusively on negatively motivated experiences. Such studies indicate that glucocorticoid hormones (corticosterone in rodents, cortisol in humans), released from the adrenal cortex during arousing episodes, are crucially involved in facilitating the consolidation of long-term memory of these experiences (Abercrombie, Speck, and Monticelli, 2006; Okuda Roozendaal, and McGaugh, 2004; Roozendaal and McGaugh, 2011; Schwabe, Joëls, Roozendaal, Wolf, and Oitzl, 2011). Corticosterone or specific glucocorticoid receptor (GR) agonists are known to act upon different loci within the emotional memory network, including the basolateral amygdala, hippocampus and various cortical regions, to enhance memory consolidation of training on a wide variety of aversively motivated learning tasks (Fornari, Wichmann, Atucha, et al., 2012; Miranda, Quirarte, Rodriguez-Garcia, McGaugh, and Roozendaal, 2008; Quirarte, Ledesma de la Teja, and

Casillas, 2009; Roozendaal, de Quervain, Ferry, Setlow, and McGaugh, 2001; Roozendaal, McEwen, and Chattarji, 2009; Roozendaal and McGaugh, 1997). Further studies report that arousal-induced noradrenergic activity is required for enabling the effects of glucocorticoids on memory consolidation (Barsegyan, Mackenzie, Kurose, McGaugh, and Roozendaal, 2010; Quirarte, Roozendaal, and McGaugh, 1997; Roozendaal, Okuda, de Quervain, and McGaugh, 2006), a mechanism that might explain why glucocorticoids selectively affect memory formation of experiences that are emotionally arousing (Abercrombie et al., 2006; Okuda et al., 2004; Roozendaal, Okuda, de Quervain, et al., 2006). Despite extensive evidence indicating that the release of endogenous glucocorticoids is initiated not only during aversive or noxious stimulation but that corticosterone levels also mount in response to appetitive and rewarding stimuli such as food, drugs of abuse or sexual activity (Buwalda, Scholte, de Boer, Coppens, and Koolhaas, 2012; Koolhaas et al., 2011; Piazza and Le Moal, 1997), little is known concerning the influence of glucocorticoids on the consolidation of memory of positively motivated learning experiences (Micheau,et al., 1985),

Model and Participants

This pilot study is exploratory and investigates the feasibility of a framework to show that the stimulus in question could actually manipulate inspiration and memory. Therefore, we conducted a study to test end user salivary Cortisol levels as a surrogate for end user acceptance of a medical software package that facilitated the digitization of electronic health records. Users evaluated their intention to use the technology based on the TAM model. TAM is often used to obtain user evaluations of information technologies. The assumption is that "users will give evaluations based on the extent to which systems meet their needs and abilities" (Davis 1989). For the purpose of our study, we define user evaluations as user perceptions of the ease of use and perceived usefulness of the medical modules based on their ability to complete tasks in a timely and reduced error environment. Our model is as follows and the hypotheses follow from the model.

Inspiration→ increased salivary cortisol→ increased memory→ decreased errors and time→ better perceptions

Participants were 74 end users from around the nation. Participants' mean age was 39.61 years (SD = 1.24). They included medical doctors (46.8 percent), nurses (25.7 percent), ancillary service personnel (17.8 percent), and health care staff (9.7 percent). Participants were not biased toward either gender and were asked not to drink any fluids during the training. The participants voluntarily agreed to the training at a major international medical conference. Thirty-seven of the participants were randomly selected for the control group and 37 in the treatment group and placed in separate rooms. All 74 participants were given a baseline salivary Cortisol swab at 9:00 am as a pretest. Then the treatment group viewed the "I'm an IBMer. Let's build a smarter planet" video clip and listened to an inspirational speech on how the handheld technology could be used to improve patient care through decreased time and errors. Trainers gave sufficient training to enable participants to operate and evaluate the modules. The training program included instruction, handouts, and hands-on training with the modules on handheld devices. A customized training application was installed on each device, and the instructors guided the users in working with it to learn how to operate the equipment and modules. Both groups were tested for salivary cortisol as a baseline and upon completion of the tasks and TAM survey.

The instructors ensured that all users were thoroughly familiar with the equipment, modules, and objectives of the study before they participated in the evaluation. The instructors taught the users how to operate the device and module controls, enabling them to follow the steps of operation from startup to shutdown. The users also learned the steps that they would be asked to follow during the evaluation, including entering data into the modules according to scenarios developed by us. When training concluded, the users were able to switch on the devices, open the modules, enter data according to scenario test scripts, print the form associated with the scenario, close the modules, and switch off the devices. Throughout the process, personnel familiar with the modules and scripts were on hand to provide support and answer questions.

After successful completion of training, participants completed four scripts using the medical software modules. The scripts guided the users through the process of completing medical forms. Code embedded in the software captured date/time metrics regarding the length of time it took users to enter data associated with each form. After users completed a script, they printed the applicable forms using wireless printers supplied by us.

Upon conclusion of the field testing a post test salivary Cortisol sample was taken from both groups. The personnel collected the devices installed with the medical modules. We reviewed and analyzed the date/time metrics collected by the embedded code. We calculated and report here descriptive statistics for each script as well as data on the completeness and accuracy of the forms.

RESULTS

The results of the study provide support for the theory that emotional memory enhancement is a well-recognized phenomenon that helps us to remember important life events. Table 1 gives evidence that the data are normally distributed. Table 2 indicates that there was not a gender bias between the control and treatment group. However, there is a difference between the means of the control group and the group aroused by the pep talk introduction and video "I am an IBMer" in terms of cortisol level, number of mistakes made on the training exercise and time to complete the task. For example, there is a significant difference between the means of the mean of 310.49 seconds to complete the task for the control group and the 218.81 seconds for the inspired group to complete the task which is significant at $p<=0.005$. Similarly, the mean for the control group was 2.95 mistakes, while the treatment had a mean of 1.35 mistakes which is a significant difference of $p<0.000$. Overall, the cortisol level for the inspired group was 29.32 µg/dL versus 13.00 µg/dL which was significant at $p<0.000$. Table 3 shows that there is a negative correlation between the increase in the cortisol level due to the inspiration treatment and the number of treatment errors or mistakes (-.885). In other words, as the inspiration increases the cortisol level, the number of errors decreases. Likewise, as the inspiration increases the cortisol level the number of seconds to complete the task decreases as well (-.885). Both of these relationships are significant at the 0.000 level. Table 3 also indicates that there is no correlation between the increase in the cortisol level due to the inspiration treatment and in the inspiration control cortisol level Similarly, there is a negative correlation between the increase in the control cortisol level and the number of control errors or mistakes (-.739). Likewise, as the control cortisol level increases, the number of seconds to complete the task decreases as well (-.738). Both of these relationships are significant at the 0.000 level. There is no correlation between the cortisol levels of the inspired group and control errors (-.053) and control time to complete in seconds (.269) of the control group. Conversely, there is no correlation between the cortisol levels of the control group and treatment errors (.192), or with treatment time to complete (.225) of the inspired group. From this, we can conclude that there were some naturally occurring increases in cortisol levels in the control group, but not as high as in the inspired group who overall not only had significantly higher cortisol levels but significantly fewer errors and significantly fewer time to completion. In fact the inspired group had, on average, twice the cortisol levels as the control group, i.e. 29.32 versus 13.00 respectively and varied significantly from their baseline readings.

Table 4 demonstrates that there is a good fit between the increased cortisol levels due to treatment and the predictors of number of errors and the time in seconds to complete the task, after the treatment. In fact, 80.8% of the variation in the dependent variable is explained by these two variables. Table 5 shows that the overall model is significant at the 0.000 level. Table 6 shows that both time ($p=.045$) and errors ($p=.035$) contribute to the model and that both are negatively correlated with inspiration and the resulting increased cortisol levels.

	N	Range	Minimum	Maximum	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Control seconds	37	480.00	160.00	640.00	11488.00	310.4865	15.99224	97.27699	9462.812
Treatment seconds	37	488.00	46.00	534.00	8096.00	218.8108	21.82540	132.75873	17624.880
Error treatment	37	5.00	.00	5.00	50.00	1.3514	.26343	1.60236	2.568
Error control	37	5.00	1.00	6.00	109.00	2.9459	.21556	1.31119	1.719
Inspiration	37	35.00	5.00	40.00	1085.00	29.3243	1.39500	8.48546	72.003
Control inspiration	37	23.00	5.00	28.00	481.00	13.0000	1.14556	6.96818	48.556
Gender treatment	37	1.00	1.00	2.00	54.00	1.4595	.08306	.50523	.255
Gender control	37	1.00	1.00	2.00	55.00	1.4865	.08330	.50671	.257
Valid N (listwise)	37								

Table 1: Descriptive Statistics

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Control seconds – Treatment seconds	91.67568	184.62892	30.35281	30.11733	153.23402	3.020	36	.005
Pair 2	Error treatment – error control	-1.59459	1.92151	.31589	-2.23526	-.95393	-5.048	36	.000
Pair 3	inspiration – control inspiration	16.32432	12.12448	1.99325	12.28182	20.36683	8.190	36	.000
Pair 4	Gender control – gender treatment	.02703	.60030	.09869	-.17312	.22718	.274	36	.786

Table 2: Paired Samples Test

		Control seconds	Treatment seconds	Error treatment	Error control	Inspiration	Control inspiration
Control seconds	Pearson Correlation	1	-.271	-.164	.762**	.269	-.738**
	Sig. (2-tailed)		.105	.332	.000	.107	.000
	N	37	37	37	37	37	37
Treatment seconds	Pearson Correlation	-.271	1	.936**	.078	-.883**	.225
	Sig. (2-tailed)	.105		.000	.646	.000	.180
	N	37	37	37	37	37	37
Error treatment	Pearson Correlation	-.164	.936**	1	.142	-.885**	.192
	Sig. (2-tailed)	.332	.000		.403	.000	.256
	N	37	37	37	37	37	37
Error Control	Pearson Correlation	.762**	.078	.142	1	-.053	-.739**
	Sig. (2-tailed)	.000	.646	.403		.754	.000
	N	37	37	37	37	37	37
Inspiration	Pearson Correlation	.269	-.883**	-.885**	-.053	1	-.224
	Sig. (2-tailed)	.107	.000	.000	.754		.183
	N	37	37	37	37	37	37
Control inspiration	Pearson Correlation	-.738**	.225	.192	-.739**	-.224	1
	Sig. (2-tailed)	.000	.180	.256	.000	.183	
	N	37	37	37	37	37	37

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3: Correlations

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.899[a]	.808	.796	3.82869

a. Predictors: (Constant), errortreat, Treatmentseconds

Table 4: Model Summary

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2093.707	2	1046.853	71.414	.000[a]
	Residual	498.401	34	14.659		
	Total	2592.108	36			

a. Predictors: (Constant), errortreat, Treatmentseconds

b. Dependent Variable: inspiration

Table 5: ANOVA[b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	38.891	1.763		22.063	.000
	Treatment seconds	-.028	.014	-.444	-2.078	.045
	Error treatment	-2.488	1.131	-.470	-2.200	.035

Table 6: Coefficients[a]

Figure 1 is the Robust Inspired Memory Model and it demonstrates several other interesting findings. A preliminary psychometric assessment of the survey instrument indicated that all values were above acceptable standards (Table 7). Table 8 demonstrates several other interesting findings. The RMSEA was achieved at 0.00 and the model was fitted successfully using a $\chi 2$ of 1413.14 in the robust inspired memory model. To assess discriminant validity, we set some regression weights to 1 and did not estimate them to determine whether their correlations were significantly different from unity. Therefore, when social norms increased by 1, then X1 increased by 1 as well. The same was true for attitude on X4 and perceived behavior control on X7. The probability of obtaining a critical ratio as large as the absolute value was less than 0.0001 for most of the regression weights. Therefore, the regression weight for the latent variable social norms in the prediction of X2 (0.694***) was significantly different from zero at the 0.001 level. The same was true for the regression weights for attitude on X6 (1.380***) and perceived behavior control on X8 (1.300***). The standard errors were small, 0.03 (social norms), 0.03 (attitude), 0.03 (perceived behavioral control), 0.028 (memory), 0.023 (inspiration), and 0.026 (inspired memory), and therefore we believe that the parameters were estimated correctly.

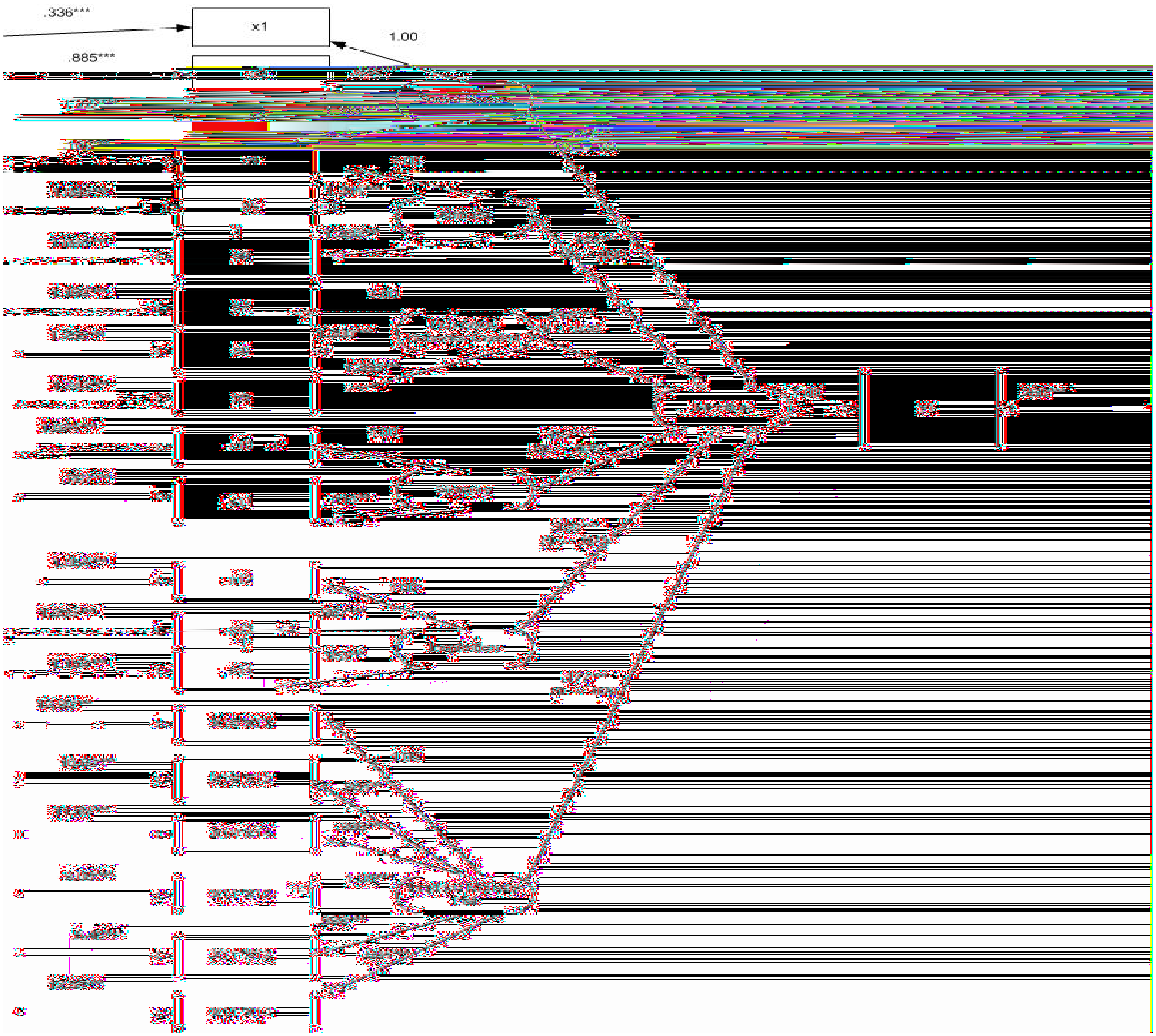

Figure 1. Robust Inspired Memory Model

Table 9 gives the goodness of fit or R squared for the survey regression model and demonstrates that 79.9% of the variation in the overall use dependent variable is explained by the perceived usefulness and perceived ease of use independent variables. The overall model was significant as shown in Table 10, with $p<0.000$. Table 11 illustrates the contribution of the individual independent variables.

	Reliability	Loading	Mean	SD	Scale
Social Norms	0.770		5.075	0.699	(1–6)
People who influence my behavior think that I should use the system. (x1)		.863			Strongly disagree to Strongly agree
People who are important to me think that I should not use the system. (x2)		.832			
People who are important to me think that I should use the system. (x3)		.809			

Attitude	0.879		5.024	0.654	(1–6)
Using the system is a good, wise idea that I liked. (x4)		.871			Strongly disagree to Strongly agree
Using the system is a poor, foolish idea that I disliked and was unpleasant. (x5)		.928			
I was totally immersed and experienced satisfaction and pleasure while using the system. (x6)		.900			
Perceived Behavioral Control	0.746		5.004	0.841	(1–6)
I have the control, knowledge, and resources necessary to use the system. (x7)		.800			Strongly disagree to Strongly agree
I do not have the control, knowledge, and resources necessary to use the system. (x8)		.832			
Given the resources, opportunities, and knowledge it takes to use the system, it would be easy for me to use the system. (x9)		.888			
Memory	0.764		5.124	0.673	(1–6)
Time necessary to complete the training application script (x10)		.894			Most to Least
Number of errors after completing the training application script (x11)		.908			
Inspiration	0.877		5.129	0.855	(1–6)
I felt inspired by the movie clip to perform the training and to remember the tasks associated with the system applications. (x12)		.923			Strongly disagree to Strongly agree
While interacting with the system, I experienced something that inspired me. (x13)		.850			
While interacting with the system, I did not experience anything that inspired me. (x14)		.852			
Inspired Memory (I*M)	0.756		5.181	1.651	(1–6)
X10*X12		.823			Strongly disagree to Strongly agree
X10*X13		.882			
X10*X14		.752			
X11*X12		.912			
X11*X13		.812			
X11*X14		.778			
Intention to Use (formative construct) (y1 = mean of 6 items)	N/A	N/A	5.090	0.668	(1–6)
Assuming I had access to the system, I intend to use it.					Strongly disagree to Strongly agree
Given that I had access to the system, I predict that I would use it.					
I intend to use this system to solve problems, justify my decisions, and serve customers.					
I intend to continue using this system to exchange with other people.					
I intend to continue using this system to plan or follow-up on my tasks.					
I intend to continue using this system to coordinate with others.					

Table 7. Measures

Index	**Robust Inspired Memory Model**
χ^2	1413.14
Degrees of freedom	158
p	0.00
Normed fit index	0.97
Incremental fit index	0.98
Comparative fit index	0.99
Goodness-of-fit index	0.97
Root mean square error of approximation	0.00
Standardized root-meant-square residual	0.0015
R^2 for intention	74%

Table 8. Robust Inspired Memory Model Results

Adjusted R Square	Std. Error of the Estimate
.790	.344

a. Predictors: (Constant), Q16, Q3, Q13, Q12, Q9, Q6, Q11, Q7, Q5, Q15, Q8, Q2, Q14, Q4

Table 9: Model Summary

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	150.937	14	10.781	91.184	.000[a]
	Residual	38.072	322	.118		
	Total	189.009	336			

a. Predictors: (Constant), Q16, Q3, Q13, Q12, Q9, Q6, Q11, Q7, Q5, Q15, Q8, Q2, Q14, Q4
b. Dependent Variable: Q10

Table 10: ANOVA[b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.098	.260		-.378	.706
	Q2	-.059	.045	-.064	-1.314	.190
	Q3	.070	.032	.078	2.194	.029
	Q4	.250	.048	.266	5.159	.000
	Q5	-.142	.035	-.176	-4.034	.000
	Q6	-.014	.030	-.020	-.467	.641
	Q7	-.155	.036	-.188	-4.273	.000
	Q8	.306	.045	.290	6.799	.000
	Q9	.061	.038	.061	1.600	.111
	Q11	.129	.038	.126	3.394	.001
	Q12	-.009	.020	-.015	-.468	.640
	Q13	-.068	.017	-.130	-4.006	.000
	Q14	.237	.050	.222	4.786	.000
	Q15	.062	.053	.053	1.167	.244
	Q16	.309	.042	.328	7.402	.000

a. Dependent Variable: Q10

Table 11: Coefficients[a]

DISCUSSION

The current study makes several contributions to the literature. First, it is the first generalizable, national survey to attempt to experimentally manipulate inspiration and its effect on intention to use technology and memory, through measurements of salivary Cortisol. Second, it reveals that when end users reported changes in inspiration, they were also shown to have improved memory and concentration to complete test scripts in a more timely and accurate manner than the control group. Third, to our knowledge this is the first study on the impact of inspiration on memory (as measured by time to complete a script and number of errors in the script), and measure their intention with a method other than perceptual surveys, on a sample of technology end users.

The model presented here is unique because it incorporates inspiration into the TAM model to measure its effect on intention to use technology. We adapted the TAM model to develop an instrument for obtaining user evaluations of medical modules used after hearing an inspiring video clip and invigorating speech. The results show that inspiration lead to increased Cortisol levels, improved memory and intention to use with fewer mistakes and a shorter task completion time than the control group. We postulate that inspiration was the major factor that affected overall intention to use the software modules and was responsible for improved participant's perceptions that the applications were easy to use and useful, that the applications satisfied their needs, and that they felt inspired to use the applications. These results were documented with a TAM survey.

The results of the survey study participants showed that they were satisfied that the modules performed most data collection functions very well. Participants also indicated that the modules could be useful tools in collecting and disseminating data and would allow users to obtain, evaluate, and present information more efficiently than with previous methods. Overall, participants indicated that the medical modules had significant potential utility for digital data collection.

Furthermore, the results showed that the video clip successfully inspired and motivated the end users. As expected, the participants reported significant increases in inspiration and intention to use the technology after viewing the inspiring clip. What makes a stimulus inspiring is its "perceived intrinsic value" (Thrash and Elliot, 2004, p. 970) rather than its reward value. If a person perceives a stimulus as inspiring, this will increase his or her motivation to know, accomplish, or experience. In this study, participants were open to the stimulus (i.e., an inspirational speech and video clip), which increased their motivation to accept the technology in question. Based on these results, we conclude that participants found value in the stimulating video clip as reflected by the fit of inspiration into the TAM. Finally, not only did the inspirational speech increase end user inspiration, but this then facilitated increases in memory as measured by decreases in time to complete the script and the number of errors in the script and increased salivary Cortisol levels.

Future Research

This study suggests several potential avenues for future research. First, future research needs to examine populations other than medical technology end users to determine the consequences of inspiration among these populations. Moreover, individual differences due to gender or personality traits may have different effects on inspiration and motivation. Because different personality traits are correlated with inspiration (Thrash and Elliot, 2003), understanding individual differences can help further the understanding of inspiration. Second, researchers should examine consequences of change in inspiration in end users to clarify the role of inspiration versus motivation in technology acceptance. Future research should also test whether the antecedents of inspiration identified by Thrash and Elliot (2003) lead to increased inspiration. Third, simple memory experiments could be performed to determine whether inspiration leads to performance gains. Fourth, the role of administrators in this area should be studied. Fifth, researchers need to determine whether inspiration leads to absorption, creativity, and optimism (Thrash and Elliot, 2003), constructs with which it is correlated. If inspiration can indeed increase an end user's focus (i.e., absorption) or influence the end user to be creative, then it may be facilitate better performance. Social-contextual influences (see Ryan, 1995) may also increase inspiration and affect motivation, as it is well documented that such influences helping facilitate autonomy, relatedness, and competence. Sixth, the field would benefit from a more robust, larger salivary cortisol measurements that includes attitude, social norms, perceived behavioral control, facilitating conditions, motivation, memory, inspiration, and their interactions. Studying interactions between time and errors and all of the inspiration variables may provide more insight into inspired memory.

Finally, positron emission tomography and other neuroscience imaging tools could be used to study the effects of inspiration and memory on intention. Inspirational memory forms a bridge between social and cognitive psychology and paves the way to neuro–information systems. It affects intention to use both emotionally (through idea inception from the inspiration) and physically (by improving memory through reduced the time to complete a training script and reduced number of errors on the script). The next step in the progression of this research should be to measure brain waves via positron emission tomography and other imaging tools to result in social-cognitive neuroscience breakthroughs.

Conclusion

The present research began in 2008 with the aim of exploring the use of a portable platform for electronic collection of operational-level medical information at the point of care. We found that use of an inspirational stimulus increased end user memory through fewer errors on the devices and less time to complete a task while enhancing intention to use the technology and increased salivary Cortisol levels. Thus, the modules used in this study show promise for improving patient care through increased accuracy of data and decreased errors resulting from transcription. The use of these modules on a handheld device will also increase flexibility in data collection during fieldwork. Our software team is using participant feedback and end user data to make improvements to the modules.

The present results suggest that inspiration may be a particularly salient construct in the domain of technology acceptance. However, more research is necessary. Managers need to know how to increase autonomy among end users, because this will result in end users having a better experience and being more likely to adhere to tough and demanding training programs. Inspiration is a new and little known variable that warrants future research because of its link to performance gains and positive emotions both inside and out of the technology acceptance context. In addition other salivary components such as epinephrine should be explored as a consequence of inspiration on memory and intention to use technology. The MIS community needs to move away from a predominantly survey based methodology to a more scientific method of measuring the end user's true intent to adopt technology if progress is to be made in this area of research.

The triangulation of the SEM model, the regression model and the salivary cortisol model all support the TAM model. The end user's perceptually rated the software application favorably in terms of perceived ease of use, perceived usefulness and use. The SEM model gives evidence that inspiration is a latent factor that effects use and memory. The salivary cortisol measurements lend credence to the contention that inspiration increased end user memory by decreasing errors and time to completion in the training scripts.

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